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(71) Applicant
John Guest Limited (United Kingdom),
Horton Bridge Road, West Drayton, Middlesex UB7 8JR

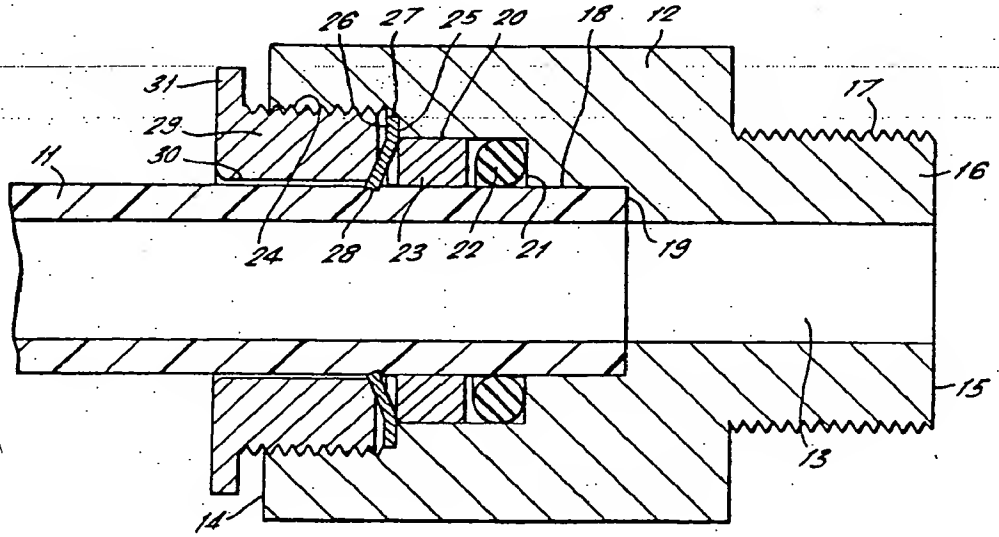
(72) Inventor
Colin John Kirk

(74) Agent and/or Address for Service
Boult Wade & Tennant,
27 Furnival Street, London EC4A 1PQ

(54) Improvements in or relating to tube couplings

(57) The disclosure relates to a tube coupling having a hollow body 12 with a throughway 13 having a counter bore 18 in which an O-ring seal 22 is mounted to seal with the tube. In order to lock the tube in the throughway a spring washer 26 is mounted in the throughway having a plurality of radially inwardly extending resilient fingers 28 angled outwardly towards the open end of the throughway. A clamping sleeve 29 is screwed into the end of the throughway to bear against the resilient fingers and force them into gripping engagement with the outer periphery of a tube in the throughway to lock the tube in place. The arrangement is particularly suitable for a soft-walled tube such as plastic tubing.

FIG. 1.



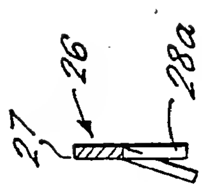


FIG. 2A.

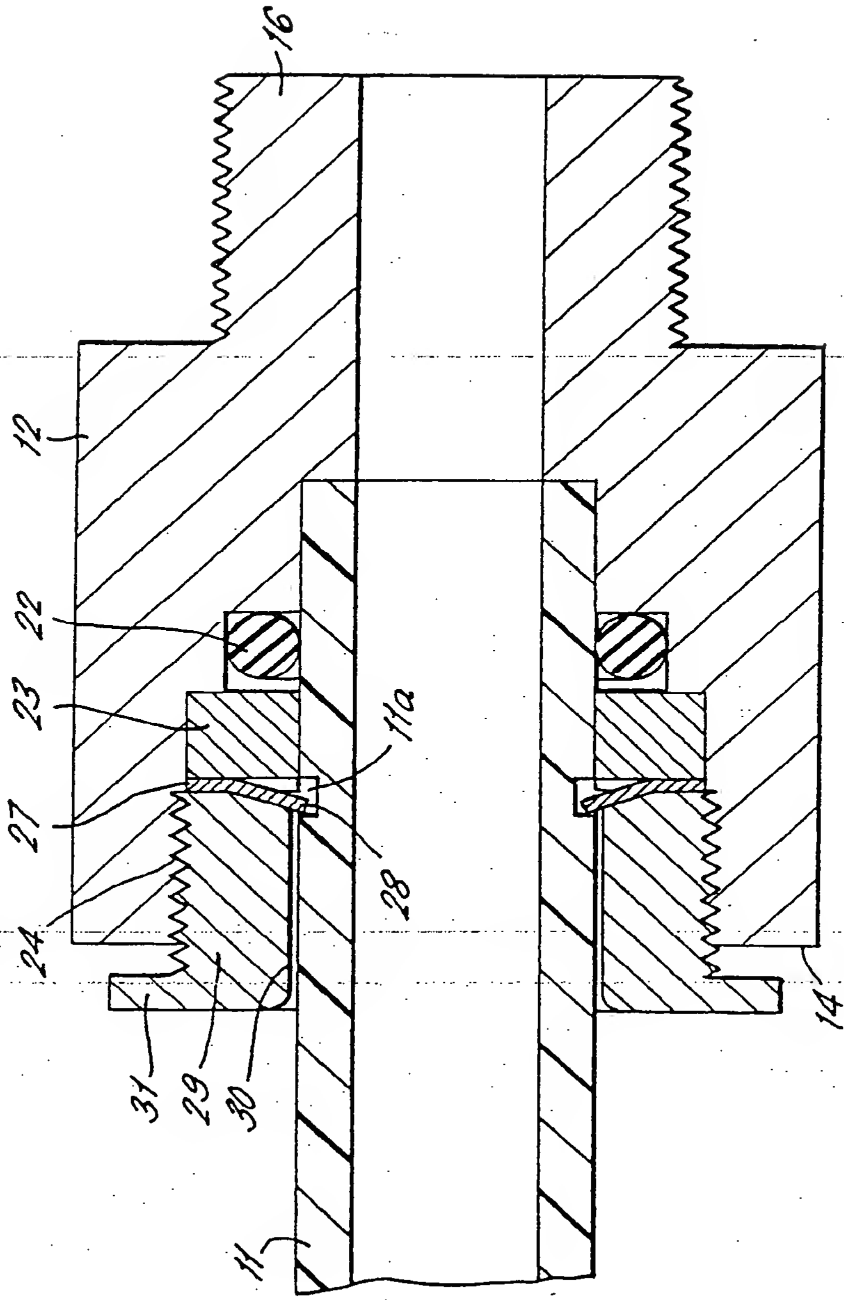


FIG. 2.

fingers 28 spaced apart around the inner periphery of the ring and inclined out of the plane of the ring 27 towards the end 14 of the body. The inner diameter formed by the inner ends of the resilient fingers 28 is marginally greater than the outer diameter of the tube 11 so that the tube can be threaded through the washer when the latter is in its relaxed condition. The counter-bore 24 is formed with an internal screw-thread in which an externally screw threaded sleeve of a clamping member 29 engages. The sleeve has an internal bore 30 through which the tube 11 passes with clearance and projects from the end 14 of the body and is formed at said projecting end with an external manually engageable flange 31 to facilitate turning of the sleeve. The other end of the sleeve 29 bears against the resilient fingers 28 and by turning the sleeve to screw the sleeve into the body, the sleeve gradually presses the resilient fingers 28 inwardly towards the plane containing the outer ring of the spring washer. In so doing the inner ends of the spring fingers 28 are forced into gripping engagement with the tube 11 to lock the tube in the body. The gripping force applied by the spring fingers can be readily adjusted by turning of the clamping sleeve 29 to suit the form of tubing engaged in the coupling, a relatively low force being required for a soft wall tubing such as plastics tubing whereas a considerably higher force is required for hard plastics or metal walled tubing.

When it is required to release the tube from the coupling, the clamping sleeve is simply unwound sufficiently to release the gripping action of the spring washers with the tubing or, if the spring fingers of the washer have become permanently engaged with the tubing, the sleeve can be screwed fully out from the body and the tube and washer removed together. after which the washer can simply be drawn off the end of the tube.

The O-ring seal 22 provides an effective barrier against loss of fluid from the end of the tube past the counter-bore 18 to prevent escape of fluid from the coupling.

Reference is now made to Figs. 2 and 2A of the drawings which show some modifications to the above embodiment and, for the sake of convenience, like parts have been allotted the same reference numeral. Firstly, the inner ends of the resilient fingers 28 of the spring washer 26 each have a tab 28*a* bent out of the end of the washer towards the plane containing the outer ring of the washer. The length of the tab is such that as the corner of the adjacent part of the finger 28 fits into the surface of the tube 11 to grip the tube, so the end face of the tab 28*a* comes into engagement with the surface of the tube to limit the penetration of the corner of the finger into the tube surface. Thus damage to the tube particularly in the case of soft limited whilst allowing the spring fingers to grip the tube.

In a second modifcation, the tube 11 is formed with an annular groove 11*a* at the location where the spring fingers will engage the tube to receive the ends of the spring fingers and thereby hold the tube 11 in the coupling body 12 to prevent the tube from being withdrawn whilst enabling the tube to swivelled, for example, for alignment of the other end of the tube with a further component. The counter-bore 24 is extended to accommodate the spacer ring 23 which may be of comparable axial thickness ot that of the originally described embodiment or a ring of reduced thickness can be used comparable to the thickness of the spring washer. Further, for low pressure applications, the spacer ring 23 may be omitted altogether.

CLAIMS

1. A tube coupling comprising a hollow body having a throughway with an opening at one end of the throughway into the body, a part of the throughway adjacent said opening being adapted to receive a tube end inserted into the body, a seal mounted in the body in said part of the throughway to seal with a tube inserted therein, and a washer supported at its outer periphery in the throughway between the seal and said opening to encircle a tube received in said part of the throughway, the washer having resilient teeth around its inner periphery inclined outwardly from a plane containing the outer periphery of the washer at their free ends towards the open end of the throughway and clamping means mounted in the throughway between the washer and the open end of the throughway bearing against the resilient teeth to force the teeth inwardly towards the plane of the periphery of the washer and thereby causing the inner edges of the teeth to move inwardly for gripping or engaging with a tube passing through the washer.

2. A tube coupling as claimed in claim 1 wherein the clamping means is adjustably mounted along the throughway to vary the clamping pressure applied to the resilient fingers of the washer and thereby vary the gripping force on the tube.

3. A tube coupling as claimed in claim 2 wherein the clamping means comprises an externally threaded cylindrical member one end of which engages the resilient fingers of the spring washer and the other end of which projects from said end of the throughway and the part of the throughway between the washer and said open end comprises a cylindrical bore having an internal screw thread with which the thread on the sleeve engages whereby rotation of the sleeve adjusts the sleeve along the throughway to vary the clamping action of the sleeve on the resilient